Bulletin University of Montana No 26,
Biogolical Series No. 9.

Seventh Annual Announcement

OF THE

University of Montana Biological Station

AT

FLATHEAD LAKE

BIGFORK, MONTANA.

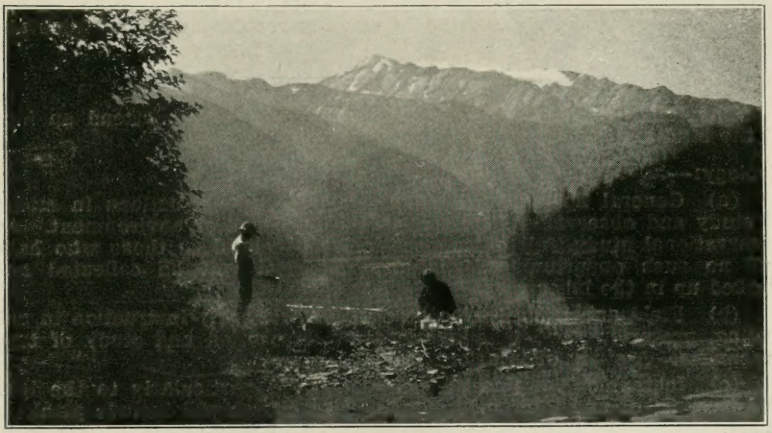

Fig 41. Camp at Stanton Lake.

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SEVENTH SESSION, JULY 12 to AUGUST 17, 1905.

Oscar J. Craig, President, University of Montana, Lecturer.

Morton J. Elrod, Professor of Biology, University of Montana, General Zoology, Entomology, Plankton.

Thomas A. Bonser, Science, Spokane High School, Botany.

Gertrude P. Norton, East Helena, Nature Study, Artist.

Entered August 24, 1901, at Missoula, Montana, as second class matter, under an Act of Congress, July 16, 1894.

Purposes of the Station.

To serve as a field for research work in Botany, Zoology and Geology. To offer research work to candidates for a degree, such work being accepted by the University of Montana. To furnish a general course to college students, or to those preparing to teach. To make a place for high school students, where they may be permitted to work under the most favorable opportunities. To afford opportunity to teachers to collect material for class use and for their own laboratories. To provide lectures, field excursions, and laboratory exercises so as to give the best insight into the proper method of nature study. To see some of the grandest scenery in the world, and to receive the inspiration felt by those who see grand panoramas. To offer a place where healthful recreation may be had, free from care, under inspiring conditions, accompanied with an environment stimulating observation and investigation. To offer a place where kindred spirits in the state may meet and exchange ideas and by this friendly meeting receive added stimulus and enthusiasm for work.

COURSES OF STUDY.

The following scheme will give those who wish to attend an idea of the kind and character of the work that may be done.

Zoology:—

(a) General Zoology, principally field work, instructions in modes of study and observation, illustrating the influence of environment. An observational study, full of suggestion, very helpful to those who have had no such opportunity for study. Material will be collected and worked up in the laboratory.

(b) Field and laboratory course in Entomology. Instruction in collecting, preserving and labelling insects. Dissection and study of type specimens. A study of injurious insects.

(c) Ichthyology. Special course devoted particularly to the lake and river fishes and their food supply. The course will include plankton study.

(d) Ornithology. A study of birds, with methods of collecting, making and preserving skins; habits and lives of birds of the rich avian region adjacent.

Botany:—

(a) Laboratory and Field Course. Study of type forms of Algae, Fungi, Lichens, Bryophytes, Pteridophytes, and Spermatophytes. Especial attention will be given to the Conifers of the vicinity. There will also be collecting trips in the field, where the various type forms may be found. In the laboratory, attention will be given to the classification of the more common species, to the study of Plant Morphology, to the methods of preparation of Herbarium specimens, and to the methods of preservation in liquid for immediate or permanent use.

(b) Ecology. A general course including local ecological problems, and local plant geography. This region offers quite a diversity in plant societies.

Photography:—

The region offers rare opportunities for this branch of study. The work will include a study of lenses, plates and developers. The use

Fig. 42. An expedition of biological students, at work on Flathead Lake. Photo by M. J. E.

of the ray filter will be explained, and the many errors which may fall to the lot of the beginner will be pointed out. The course will include the selection of subject, development, printing on one or two kinds of paper, and transparencies.

Students in photography must supply their own plates or films and paper. There is a dark room at the laboratory and the scenery in the vicinity gives ample scope for a series of negatives either in landscape or of scientific subjects.

Nature Study:—

A course of study and practical work will be outlined which will afford both a fund of information on which to draw during school work and at the same time secure a collection of material to be used in illustration. The scope of the work will include zoology, botany, geology, and physiography of the region.

Physiography:—

This subject is receiving more attention than formerly. Those who desire such work will be given methods which may be used in any locality, and by excursions will be shown how to carry on observations. The course will include the surface geology, drainage, climatic conditions, and effects of vegetation.

Special Work:—

Students and investigators will be encouraged to pursue some special study, taking such problems as may be pursued with profit during the session.

It must be understood that while the daily lectures are given to all, yet each individual works alone, pursuing such study as may be best fitted to his ability and requirements. The beginner has the same opportunity as the advanced student. Realizing that study of biological subjects is not extensive in the state, preparation is made for those who have not pursued such study.

LOCATION.

The University of Montana Biological Station was opened in 1899. For the past six summers the station has been occupied from June until September or October. During this time some twelve states have been represented. The Station has become well known to many American naturalists, and all are enthusiastic in their praise of opportunities afforded in the vicinity of Montana's large inland lake.

For scenery the vicinity cannot be surpassed. Few places offer more varied points of interest. The roaring rapids of Swan river are at the door of the building. Flathead lake, covering more than 300 square miles of territory, with its beautiful islands and precipitous shores, has great attractions. The Mission range, beginning on the burnt hills by the laboratory, and rising higher and higher as they extend southward, culminate in snow capped peaks 10,000 feet in height. A few miles to the east is the Swan range, its high summits constantly in view. These two mountain ranges afford some of the most beautiful panoramas to be seen in the Rocky Mountains, and rival the Alps in magnificent scenery. Farther to the east, reached in a short time by pack train, the main chain of the Rocky Mountains breaks the horizon with lofty peaks and precipitous summits. Untrod summits invite the courageous naturalist who seeks the unknown animal and vegetable life. West of Flathead lake are the almost unexplored Cabinets. Within a few miles are many lakes—Swan, Echo, Rost, and others—while many ponds and swamps are in the immediate vicinity. The waters of Swan and Flathead rivers supply Flathead lake, the former at the laboratory door, the latter but two miles distant. East and south of the laboratory the forests extend

Fig. 43. A hanging glacier on G. N., in late August. Characteristic mountainous country which may be reached, and where rare species may be had. Photo by M. J. E.

unbroken for a hundred miles, with here and there a settler's cabin. Such a combination of lakes, rivers, mountains, forests, at elevations from 3,000 to 10,000 feet, one will find in few places in America.

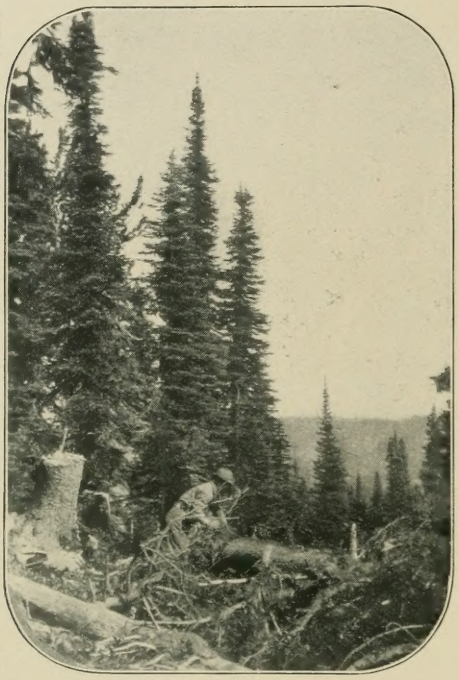

Fig. 44. Collecting samples of Alpine Fir for the University Museum. Photo by M. J. E.

The present site of the Station was chosen because of the advantages mentioned above. The seaside will always have its attractions and its devotees. But there are those who love the mountains, who delight in craggy heights, and who find abundance of material for study because it is new and the field unexplored. There are many who cannot take long trips to the sea shore, others who wish to spend a summer on the inland lakes, in the primeval forest, and among the snow-clad hills. Then there is the home field. Montana needs a wider dissemination of knowledge of outdoor study. Here may be had healthful recreation, beautiful surroundings, congenial associates, and rare opportunities for observation and study.

Fig. 45. A bit of Flathead lake, near the Laboratory. Photo by M. J. E.

The climate is delightful. Rarely does it rain in July and August. In the shade it is always pleasant. Long trips may be planned without danger from the elements. One may sleep out without fear. In a day from the laboratory one may reach huge snow banks in middle August. There is an abundance of sunshine, no fogs nor dreary days, and few days of excessive heat.

Further information in regard to the station and its work may be found in the bulletins mentioned later in this circular, and in the following publications: Journal of the New York Botanical Garden, January, 1902, pp. 8-13; Journal of Applied Microscopy, Vol. IV, No. 5, pp. 1269-1278; Science, U. S., Vol. XX, pp 205-212; Rocky Mountain Magazine, Vol. IV, No. 4, 1901, pp. 781-787.

EQUIPMENT.

The building is a convenient out-door laboratory, with tables for a dozen students. The station work has entirely outgrown the building. Many of the lectures are given out of doors in the yard. The fine

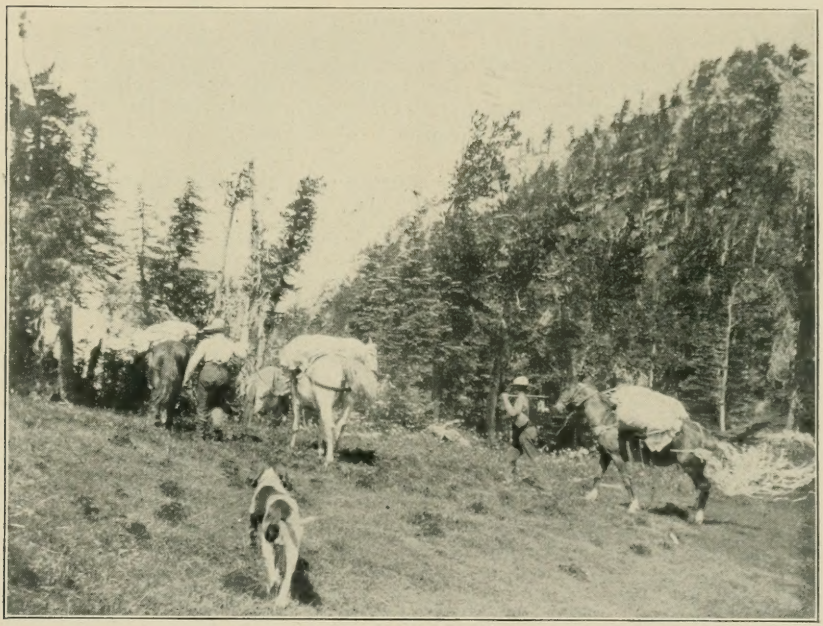

Fig. 46. Returning from a trip to the mountains, starting down on the trail. Photo by M. J. E.

summer weather permits of much laboratory work out of doors. There is a dark room for photography. There are three boats which are the property of the station. Other boats may be had at any time. Microscopes, glassware, books and utensils will be supplied from the University. Botanical collecting and drying material will be supplied.

Students in Ornithology must supply their own guns or field glasses. Necessary ammunition will be supplied at cost. Students in Photography will furnish their own cameras and plates. The necessary chemicals for development will be supplied free. Students who live in tents will supply their own tents and bedding.

UNIVERSITY CREDITS.

Students from the University may pursue study at the Station and receive credit for such work as may be equivalent to University courses. Students taking elementary study may receive preparatory credits.

METHODS OF INSTRUCTION.

The work will consist very largely of field collecting and observation, study of relation to environment, supplemented by laboratory dissections and miscroscopic examination. The general courses will enable teachers to familiarize themselves with methods of field work, and give a store of information from which to draw in nature study subjects. The general courses also give opportunity to students and others to pursue lines of study with better facilities for out door work with fresh material, than is generally to be had in regular university work.

The expeditions are primarily to give opportunity for the study of animals and plants in their natural environment. By this means more lasting interest is aroused, and more accurate information is obtained.

LECTURES.

Almost every day a lecture on some biological topic will be given at the laboratory. Some of the lectures given in 1902 have been incorporated in Bulletin University of Montana, Biological Series No. 5. Thirteen lectures, covering 90 pages, with 5 plates and 27 figures, are included.

The following lectures will be given during the coming session:
Instinct and Intelligence in Animals.
The Debt of Science to Lewis and Clark, with Stereopticon.
The Forests of Flathead Valley.
The Geology and Natural History of Flathead Lake.
Montana's Agricultural Water Supply, with Stereopticon.
Studies in Alpine Life, with Stereopticon.
The Mosquito Problem.
The Place of Field Work in Scientific Study.
The Mission Mountains, with Stereopticon.
Evolution of Plant Forms, with Stereopticon.
Evolution of Plant Reproduction, with Stereopticon.
Elementary Forestry.
Plant Societies of the Northwest.
The Coniferae.
Seed Dispersal.
The Ancient History of America.
Nature study for the Grades.
Nature Reproduced in Art.

EXCURSIONS.

The following excursions will be taken during the session of 1905, unless the weather is unfavorable:

1. A trip to Swan Lake, through the forests, with stop over night at the lake. This is a beautiful lake in the mountains, of great interest biologically and geologically.

2. A trip to Rost Lake, at the base of the Kootenay Mountains. This is a lake almost filled up, a fine collecting field. It is an admirable location for camps.

3. An ascent of MacDougal Peak via an Indian trail, to an altitude of 7,725 feet. This will afford opportunity for alpine collecting, and will present some of the most sublime scenery in the world.

4. A trip around Flathead Lake, making study of its banks, bays, and swamps.

Fig. 47. Alpine region in the Swan Range, visited annually for the collection of Alpine species. Photo in August by M. J. E.

These trips will be under the personal supervision of the Director of the Station. Those taking the trips must bear a proportionate share of the expense necessary. Such trips will prove of great value and interest biologically aside from the pleasures they bring. These trips are not for mere pleasure, but for scientific study. Daily conferences are held to report on observations and to make suggestions.

HOW TO REACH THE STATION.

Students via Northern Pacific will get off at Selish. Stage tri-weekly, runs to Flathead Lake (35) miles), connecting with steamer Klondyke, which runs across the lake. Stage fare, one way, $3.00, round trip, $5.00, trunks extra. Boat fare across the lake, one way, $3.00, round trip, $5.00. Stage leaves Selish on Mondays, Wednesdays and Fridays, connecting with the steamer, returning the same day. A daily stage, carrying mail and passengers, runs from Selish to Polson via Mission and Ronan. Passengers may thus travel to Polson daily. Both stages start from Selish, reaching Polson by different routes. They are under different managements.

Students via Great Northern will get off at Kalispell, connecting by stage with the steamer Klondyke at Demersville, a short distance from Kalispell.

Fig. 48. A Portion of Echo Lake, Near the Laboratory.
Photo by Ricker.

DATE OF OPENING.

The laboratory work of the Station will begin Wednesday, July 12, and continue five weeks, or until Thursday, August 27. For a week or more before the Station opens some one of the staff will be at or near the Station, and will aid any who may choose to work during such time. The laboratory is at the disposal of students from June 15 to September 1, or even later, if any wish to use it.

BOARD AND ROOM.

Most of those at the Station, including the staff, live in tents. A few tents are for rent. Day board may be had at $4.50 to $5.00 per week. Board and room may be had at $7.00 per week. Many prefer to do their own cooking. The stores supply all the necessaries of life, while the region affords an abundance of fruit and vegetables. Daily mail gives easy communication with the outside world. There is also telephone connection.

RECREATION.

Change is rest. To take a day off and go a fishing often gives new lease of life. The tingle of the nerves when the gamey fish tugs at the line is to forget care and to be thoroughly alive. Many will wish to combine an outing with study. In fact, one of the attractions of the place is its natural advantages so as to induce out-door exercise and study. The lake and rivers make rowing a good pastime. The photographer has a field of wondrous richness and varied interest. A fine sand beach makes bathing a delight, and it is indulged in. Unless the lake is stirred by winds the water is warm. The hills and forests afford quiet retreats for study or strolls. The hills and roads give glimpses of scenery of rare beauty. At the proper season hunting is good. Deer have been seen annually a few rods from the laboratory. Grouse and pheasants abound in the hills. In season duck shooting is fine. A day's tramp will take one to the home of the Rocky Mountain goat. In a day one may penetrate a pathless forest or stand on craggy heights, where the view presents the jagged Rockies, the bockbone of the continent.

PUBLICATIONS.

Articles from persons who have attended the station or taken part in its work have appeared from time to time in such magazines and periodicals as The Journal of Applied Microscopy, The Nautilus, Science, The Condor, The Botanical Gazette, Journal of the New York Botanical Garden, etc. The bulletins issued by the University as a result of the work are: No. 1, "Summer Birds of Flathead Lake," P. M. Silloway, 84 pp., 16 plates; No. 2, Announcement of the Fourth Annual Session; No. 3, "A Biological Reconnaissance in the Vicinity of Flathead Lake," M. J. Elrod, 94 pp., 29 plates; No. 4, Announcement of the Fifth Annual Session; No. 5, "Lectures Delivered at the Station," 78 pp., 6 plates, 28 figures; No. 6, "Additional Notes to Summer Birds of Flathead Lake," P. M. Silloway, 32 pp., 5 plates; No. 7, "Lichens and Mosses of Montana," W. P. Harris and Carolyn W. Harris, 24 pp., 9 plates; No. 8, Sixth Annual Announcement. These bulletins are sent on request, accompanied by postage, so long as they last. Other publication are ready for the press. No. 10, "The Butterflies of Montana," is in the press.

LIFE AT THE STATION.

Conventional clothing is discarded. There is a freedom of living which makes life pleasant for those attending. Outdoor clothing is worn by all. A canvas suit with plenty of pockets is suitable for men, with a business suit for occasions. For mountain trips a suit of woolen underwear is desirable, and a sweater will come handy. For tramps in the woods, climbing mountains, or walking the rocky beach, a pair of heavy soled and hob-nailed shoes are a necessity. A suitable station suit for women consists of a short skirt over bloomers, waists, jacket, or cape, felt hat or tam o'shanter, a pair of heavy soled shoes with hob-nails, with woolen underwear for mountain trips. As most of the Station work is out of doors and of the rough and ready nature, good clothes are an encumbrance. The freedom from conventional dress makes Station life more helpful and desirable. Plenty of pockets and freedom of movement are the essentials to do successful work. The baggage may therefore be reduced to small amount. As bathing is good a bathing suit will serve for this purpose and water collecting.

BAGGAGE.

Avoid trunks. Pack outfits in rolls, covered by canvas, fastened by large and strong straps or ropes. Hand baggage of any kind is not troublesome. Heavy weight of books is unnecessary. For those who

live in tents, as most persons prefer to do, a tent is necessary. This will make a small roll, and for ordinary miner's or wall tents poles are not necessary. They may be cut after arrival.

Those who sleep in tents must remember the nights are always cool. A cheap tick, ready to be filled, and two comforts or heavy blankets over, with whatever is desired under the individual, are necessary. These can be purchased after arrival, if this is desired, and at reasonable rate. In place of the preceding a sleeping bag is a luxury.

Reduce baggage to a minimum in weight. Heavy weight of books is not advisable, but reading matter for leisure moments should be brought.

For any further information address,

MORTON J. ELROD, Director,
Missoula, Montana.

For information concerning the University, its departments, courses of study, etc., address,

OSCAR J. CRAIG, President,
Missoula, Montana.

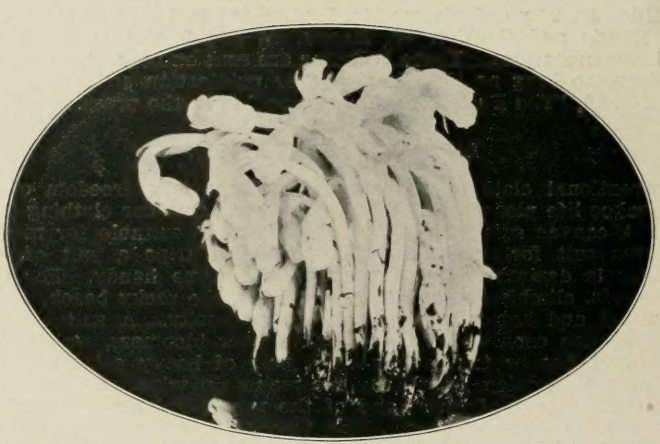

Fig. 50. A Bunch of Indian Pipe, Monotropa Uniflora.
Photo by M. J. E.